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on each crystal are R, 2R, and the trapezohedron $\frac{2P\frac{2}{3}}{4}$. When the tetartohedral plane is on the right edge of an upper rhombohedral face the crystal is dextro-rotatory.——The jeffersonite of Franklin, N. J., has been investigated crystallographically and chemically by Kloos, of Stuttgart.[1] In the prismatic zone only $\infty P \grave{\infty}$ and ∞P were found. The crystals were terminated by $0P$, $\pm P$, $2P \grave{\infty}$ and $3P\grave{3}$. The pleochroism is strong $\mathfrak{a} =$ honey-yellow, $\mathfrak{b} =$ yellow-green, $\mathfrak{c} =$ blue-green. Absorption $\mathfrak{c} > \mathfrak{a}$. Sections parallel to the clino-pinacoid gave an extinction of 17° 15′ against the vertical axis. Specific gravity 3.352. A chemical analysis yielded:

SiO_2	TiO_2	Al_2O_3	Cr_2O_3	Fe_2O_3	FeO	MnO	ZnO
39.59	1.76	11.20	0.13	5.97	11.31	3.07	0.53

MgO	CaO	Na_2O	K_2O	H_2O	total
8.42	12.85	3.31	1.95	1.02	101.11

In the light of this result the author does not feel justified in assigning to this mineral any definite constitution. The small amount of MnO would seem to indicate that the mineral under investigation is not a true jeffersonite.——Brauns[2] has discovered a new plane $\frac{17}{20} P \bar{\infty}$ in manganite from near Oberstein a. d. Nahe. ——In the clefts of a piece of soapstone from Göpfersgrün, near Wunsiedel, Sandberger[3] has found uranite and torbernite in little quadratic tables. Pseudomorphs of arsenio-siderite after siderite from Bulach in Würtemberg and greenockite from the clefts of zincblende from Brilon, Westphalia, and Neu-Sinka, in Siebenbürgen, were also found and examined by the same investigator.

BOTANY.[4]

FIGURES OF SOME AMERICAN CONIFERS.—Dr. M. T. Masters read a paper entitled "Contributions to the history of certain species of Conifers" before the Linnean Society, in January of the present year, in which some American species are critically discussed. They are as follows, viz:

Abies amabilis Forbes. This is accompanied with a nearly full-sized figure of the cone, a photo-engraving of a sterile branch, with half a dozen enlarged figures of leaves, leaf-sections, bracts, scales and seeds.

Abies grandis Lindley. A large double plate showing five cones, with figures showing details of leaf and cone structure, illustrate this species. The variety *lowiana* (= *Picea lowiana* Gordon, *Picea parsonsiana* Barron, *Abies lowiana* McNab) is described and figured. A second variety, *pallida*, is doubtfully separated. Its leaves are "of unequal length, flat, and pale in color."

Abies concolor Lindley. Figures of the cone, foliage, leaf-structure, bracts and scales illustrate this species.

Abies subalpina Engelm. Full illustrations accompany the description of this species.

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[1] Neues Jahrb. für Min., etc., 1886, I, p. 211.

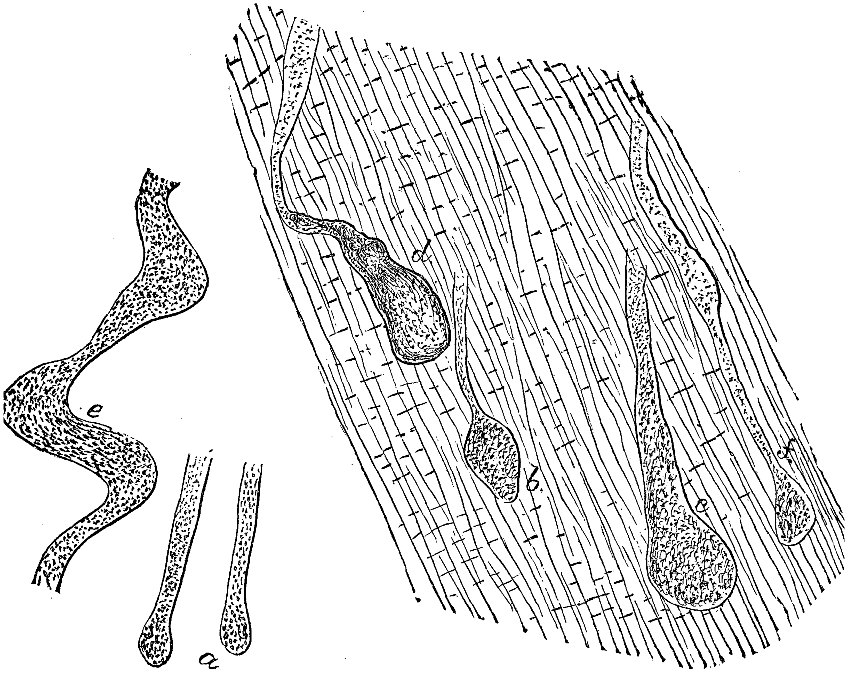
[2] Ib., p. 252.

[3] Ib., p. 250.

[4] Edited by Professor CHARLES E. BESSEY, Lincoln, Nebraska.

Abies nobilis Lindley. The typical form of this species is illustrated by a large double plate showing the foliage and cone, with details of the latter. The variety *glauca* occurs in cultivation. The variety *magnifica* (= *Abies magnifica* Murray) is illustrated by a large double plate showing cones and foliage. Details of the leaf and cones are given in wood-cuts.

STRANGE POLLEN-TUBES OF LOBELIA.—The pollen-tube as figured in the text-books and elsewhere is of nearly uniform diameter throughout its whole length. The lower portion, or that farthest from the grain (or spore) is usually shown with its contents denser than elsewhere. In the style of the *Lobelia syphilitica* I find that the ordinary form of the end of the pollen-tube is as shown at *a*. Occasionally the enlargement at the tip takes the form of nearly a perfect sphere. A spade-like form met with is shown at *b*. At *c* is shown a pollen-tube tip that is quite exceptional. The end through the thickest part is fully four times the ordinary diameter of the tube. A still more irregular tip is shown at *d*. The tube is much swollen at the extremity, while back from the end are two contractions, after which the tube is attenuated for a distance upward and again assumes its normal size. These changes in size do not all take place in the same plane. The tube twists in various directions in the substance of the style. The extent to which this variation from a direct course may proceed is seen at *e*, which shows a portion of a pollen-tube



probably only a short distance behind the tip. The end in this case was not found. The twisting increases the chances of a single tube not holding together when subjected to the razor or needles of the investigator.

All of the parts of the illustration were drawn with a camera lucida—a Grunow, which thus far has proved itself among the best. The tubes *b c d* and *f* hold the same positions to each other as they did in the conductive tissue of the style. This was an unusually rich spot in odd forms. The conductive tissue seemed loose, and there was no apparent cause for any change of direction or the formation of enlarged end. No nucleus was observed in any of the tuber-like tips. I hope to cultivate the pollen free from any tissue and observe the results.—*B. D. Halsted, Botanical Lab. Agricul. Coll., Ames, Iowa.*

BOOKS ON FUNGI.—The American student of fungi is often sorely puzzled for want of a systematic manual to aid him in his study and classification of the multitude of species which he collects or *might collect* if he could hope to do anything with them. The book which has been of most service is probably Cook's Hand-book of British Fungi, published about fifteen years ago, but its descriptions are so imperfect and the system of classification so antiquated that from the first it has been an exasperating book to use or to put into the hands of students. Of American books there are none. We have some local lists and a good many scattered papers. Dr. Farlow has given us excellent monographs of several genera. Mr. Peck has likewise published many descriptions and a number of monographs. Mr. Morgan has helped us by giving us his Mycologic Flora of the Miami valley, Ohio. Ellis and Everhart have published monographs of a number of genera. By securing complete sets of *Grevillea*, the *Torrey Bulletin*, *Botanical Gazette*, *Journal of Mycology*, AMERICAN NATURALIST and the proceedings of several scientific societies, and in addition the reports and bulletins issued by various States and colleges, one can do something, but how many, aside from the specialists, can afford to supply themselves with all these?

Two books now publishing will do much to help the ordinary botanist and botanical student. Several years ago Dr. George Winter began the publication of a new edition of the volume "Die Pilze" (fungi) of Rabenhorst's Kryptogamen-Flora von Deutschland, Oesterreich und der Schweiz. The first book of this work was completed in 1884. It includes the Schizomycetes, Saccharomycetes and Basidiomycetes. This latter class, in accordance with Winter's views, is made to include the Entomophthoreæ, Ustilagineæ and Uredineæ, in addition to the Tremellineæ, Hymenomycetes and Gasteromycetes. The second book has progressed as far as p. 592, and is thus far devoted to the Ascomycetes. From present indications this book at least will be required for the Ascomycetes, and a third book will be necessary for the three remaining classes, viz., Myxomycetes, Zygomycetes and Oömycetes. The great value of this work lies in the fact that the descriptions are very full, and include accurate measurements.

In the year 1882 P. A. Saccardo began the publication in Padua, Italy, of what is destined to be one of the great books of the century, the Sylloge Fungorum, designed to contain all the known fungi of the world. The first and second volumes are devoted to the Pyrenomycetes, of which great group about 6000 species are described. The third volume, devoted to the Sphæropsideæ and Melanconieæ, appeared in 1884. It contains descriptions of over 4000 species. Volume IV appeared in April of the present year. It is devoted to the Hyphomycetes, and describes over 3500 species.

The descriptions in Winter's work are in German, those in Saccardo's Sylloge, in Latin. Both are full, although the treatment is much more satisfactory in the former. Saccardo merely compiles, and thus often admits the same plant under more than one name, while Winter is exceedingly critical. The latter is therefore the better guide, while the former, by his liberality in admitting so many descriptions, makes these available for the critical study of students everywhere.—*Charles E. Bessey.*

A POCKET MANUAL OF BOTANY.—It would puzzle any one to make out just what the publishers of the ordinary botanical manuals had in mind when they decided upon their type, paper and binding. A manual ought to be a field book. It should be portable, with a size and weight allowing it to be carried as the companion of the collector wherever he goes. Every beginner in systematic botany ought to carry his manual with him, but it is too much to ask him to carry a two-pound book in addition to his other burdens, especially when the book is too big to go into any of his pockets. Nearly five years ago the writer brought this matter to the attention of publishers (AM. NAT., Vol. XV, p. 896) and some favorable correspondence resulted from it. But we still have the old-fashioned coarse print, thick paper, broad margined, clumsily bound manuals for use in the schools and colleges.

In the "Tourists' edition"[1] of Coulter's Botany we have the nearest American approach to the style of book with which collectors and students should be supplied. By the use of thin paper the thickness of the book is reduced to considerably less than an inch which, with the flexible leather binding, makes a book which can be carried much more comfortably than could the ordinary edition. Had the binder been instructed to trim the pages so as to leave a much narrower margin all around, the book would have been much improved. In order to test the matter the writer took his copy to a binder and had the margins cut down, resulting in what is probably the handiest botanical manual in the country. This improved copy is now exactly seven and three-eighths inches long and four and seven-eighths wide, and weighs but thirteen ounces. It slips into an ordinary pocket with the greatest ease, and can be carried by the collector wherever he goes.

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[1] Coulter's Manual of Rocky Mountain Botany. Tourists' edition. Ivison, Blakeman, Taylor & Co., New York and Chicago, 1885.

Now it must be remembered that this reduced copy of the "Tourists' edition" is printed from the identical plates used for the large book, and that apparently no attempt was made by the printer to reduce the size of page by printing closer to the *inner margin*, where at least a quarter of an inch might easily have been saved. It is probable that with considerable care the width of the book might be reduced to four and a half inches.

Until we can have something better let us have thin-paper editions of Gray's, Coulter's and Chapman's manuals, printed and bound with narrow margins *all around*, and with flexible covers which project but little if at all beyond the pages. Then let our publishers seriously consider the problem of giving us all this at a moderate cost.

When new editions of these manuals are made, the publishers can save much space by the use of thinner leads, so as to crowd the matter closer upon the pages. In this way not far from seventy-five pages might be saved, while by the use of smaller type here and there the saving might be easily carried to a hundred pages. A little book of 392 pages—the Tourists' Guide to the Flora of the Alps—lately issued by an English firm, might well be taken as a model. Of it a recent reviewer says : " Printed in clear type on thin paper, and bound in red leather in pocket-book form, it weighs less than five ounces, and is thus really suited for the pocket." And yet this book is sold for five shillings, that is, for about two-fifths what is charged for Coulter's " Tourist!"—*Charles E. Bessey.*

A CHEAP HAND-BOOK OF MOSSES.—One of the neatest little botanical books which has appeared for many a day is the Handbook of Mosses, by J. E. Bagnall, and published by the well-known London firm of Swan Sonnenschein & Co. It is a thin duodecimo book of about one hundred pages, contains thirty-nine illustrations, is bound in cloth with tastefully ornamented cover, and sells for one English shilling.

The chapters treat of the following topics, viz : Appliances and material required for the study; development; moss habitats; classification; geographical distribution; cultivation; uses; preparing specimens for the cabinet and herbarium. The chapter on classification treats the subject in a general way only, giving no more than the characters of the tribes.

We wish it were possible for American publishers to put a book of the quality, size and price of this one upon the market.

BOTANICAL NEWS. — Professor Seymour's lecture before the Minnesota Horticultural Society, in January last, is a model of what such a lecture should be. It deals plainly with a few common but imperfectly understood fungi of the fruit-garden, viz., the rusts of the raspberry and blackberry (*Cæoma nitens* and *Phragmidium rubi-idæi*); the "double blossom" of the blackberry (*Fusisporium rubi*); the raspberry "cane rust" (probably *Sphaceloma ampelinum*); and the currant disease (*Septoria ribis*). The lecture, now published in pamphlet form, closes with a few well-chosen remarks about the investigation of the parasitic fungi.——Professor Tracy has just published in the eighteenth annual report of the State Board of Agriculture a catalogue of the flora of Missouri. It includes phanerogams and pteridophytes only, and yet there are enumerated 1749 species. A study of the list shows the State to contain four well-defined botanical regions: (1) The Mississippi and Missouri *river-bottoms*; (2) the *swamp region* of the south-east; (3) the *Ozark region*, south of the Missouri river; (4) the *prairie region* of the northern and western portions of the State.——The Botanical Club of the American Association for the Advancement of Science will hold meetings in August at Buffalo, and will meet with a warm reception from the botanists and citizens of Buffalo. Although the arrangements are not yet completed, it can quite confidently be announced that the club will be tendered a half-day excursion to some one of the several interesting collecting grounds of that vicinity. The long excursion on Saturday will also be arranged to enable the botanists to have a portion of the time for collecting. The localities near the city which have been described by Mr. Day in his catalogue of Buffalo plants will prove as interesting to visiting botanists as those of any city yet visited by the club. There will also be tendered to the club, without doubt, an evening reception. There will be no lack of opportunities for becoming acquainted with one another. The first meeting of the club will be held in the room assigned to biology on Thursday morning at 9 o'clock, which is the second day of the association. Subsequent meetings will be announced on the daily programme of the association. It is hoped that the botanists will be out in still larger numbers this year than they were last, or the year before. Let every teacher of botany arrange now to be present at the meetings. The secretary of the club is J. C. Arthur, of Geneva, N. Y.

ENTOMOLOGY.

DESCRIPTION OF THE FORM OF THE FEMALE IN A LAMPYRID (ZARHIPIS RIVERSI HORN.)—

♀. Apterous, vermiform, segmented, retractile, phosphorescent. Number of joints, exclusive of the head, twelve. Legs six, two on each of the three anterior segments, or on those portions underneath representing the pro, meso and metasternum. Length, when extended in walking, two and a quarter inches; and the width across the widest part five-sixteenths of an inch.